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Social-Ecological Resilience in Cocoa Farming Systems in Alto Beni, Bolivia

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Abstract

Cocoa based small scale agriculture is the basic livelihood of most farming families in the region of Alto Beni in the Bolivian Andes. Cocoa cultivation is affected by climate change impacts, soil degradation, pests and plant diseases, and insecure cocoa prices. From a sustainable development point of view, cocoa farms need thus to become more resilient. Resilience refers to the ability within a farming system to reduce the sensitivity to stress factors while maintaining productivity, the capacity for self-organisation, to learn, and to adapt to change. Resilience can be subdivided in the three features buffer capacity, self-organisation, and adaptive capacity. This study addresses differences in resilience of organic and non-organic cocoa farms, and the most important features that influence social-ecological resilience in cocoa farming systems.

Indicators for resilience were defined in a transdisciplinary process with local experts and cocoa farmers in a workshop and focus groups. Indicators for buffer capacity were tree diversity, crop diversity, and the diversity of income sources of the farming family. Indicators for self-organisation were the interaction with farmers' organisations, their subsistence level, cocoa yields, and the annual family income. Adaptive capacity was assessed by inquiring the number of courses on cocoa cultivation family members had participated in, and the number of information sources they had. We interviewed 52 certified and non-certified households and conducted an in-depth participant observation with 15 households from the sample.

It resulted that organic farms in the research area were more diversified (tree species in cocoa plots: 4.4 vs. 1.9, crop diversity: 8.4 vs. 6.7 crop varieties on cocoa farms), and had higher cocoa yields (506 kg ha⁻¹ yr⁻¹ vs. 335.8 kg ha⁻¹ yr⁻¹, both without external inputs). Annual family income was significantly higher on organic farms with 7530.2 vs. 6044.4 USD. Organic farmers had participated in more courses on cocoa cultivation which may be the main reason for the better performance of their farms. We conclude that resilience building was enhanced by local organisations that organise organic certification and go further than basic organic certification principles by providing extension services, tree seedlings, capacity building, and certain social insurances.

Keywords: Adaptation to climate change, agroforestry, Bolivia, cocoa, organic agriculture, social-ecological resilience